LIFE CYCLE COST (LCC) REDUCTION FROM RAM AND SUPPORTABILITY ANALYSES IN ACQUISITIONS

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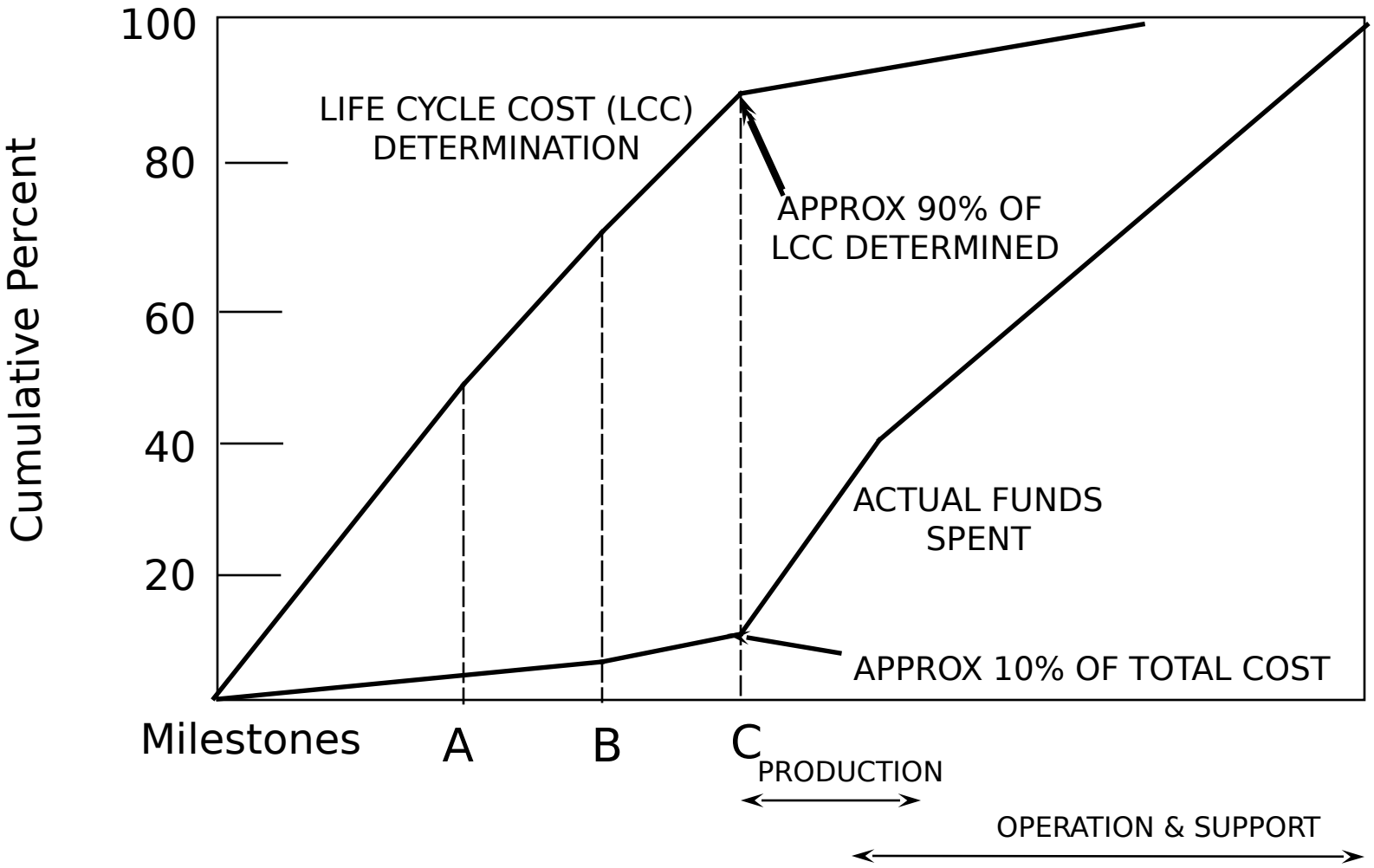
Notional System LCC Overview

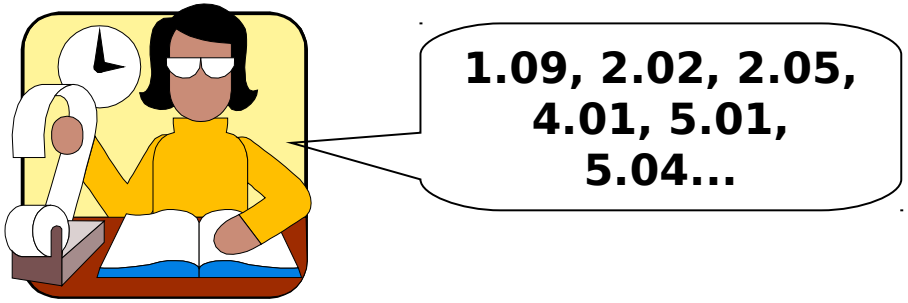


Total Ownership Cost Categories

Identified Logistics Costs & Non-Logistics Costs Regardless of Fund Type

"It's all green"

Cross Referenced to DA LCC Elements



Non-Logistics Cost Categories (Potential Investment Cost Areas)

- Development Engineering
- Producibility Engineering & Planning
- Development Tooling
- Prototype Manufacturing
- Systems Engineering & Project Management
- System Test & Evaluation
- Data/Reports
- Development Facilities
- Software Development
- Non-Recurring Production
- Recurring Production
- Production Engineering Changes
- Other Development Costs
- Other Production Costs
- Military Construction

Logistics Cost Categories
(*Initial Costs - Red* & Recurring Costs - Black)

- Operators
- Energy (POL & Batteries)
- *Field Support*
- Repair Labor
- Contractor Logistics Support
- *Warranty Costs*
- Scheduled Maintenance /Overhaul
- *Initial Provisioning*
- Replenishment Spares
- Inventory Holding Costs
- *Support Equipment*
- *Test Program Sets*
- System Specific Training
- *Training Materials*
- Post Production Software Support
- *Technical Documentation*
- Transportation
- Integrated Material Management
- Post Production Systems Engineering/Project Management
- System Hardware Changes
- *Facilities/Sites Activation*
- System Specific Base Operations
- Lease Operations & Maintenance
- Demilitarization/Disposal
- Industrial Readiness

Supportability Costs Impacted by RAM

- **Warranty Costs**

Level of Repair Analysis:

- **Organic Repair Costs**
- **Contractor Logistics Support Costs**
- **Initial Provisioning of Spares & Repair Parts**
- **Replenishment of Spares & Repair Parts**
- **Inventory Holding Costs of Spares**
- **Transportation Costs for Forward & Retrograde Shipments**

Source of Repair Analysis:

- **Support Equipment – Common & System Specific**
- **Test Program Sets**
- **Technical Documentation for Repairs**

Types of Analyses to Support Decisions

- **Best Value Analysis – Rates & Weights Multiple Factors to Evaluate the Benefits & Cost of Each Alternative (Source Selections & Pre-MS B)**

- **Logistics Support Optimization Analyses –Lowest Net Present Value Total Cost among Support Alternatives to Achieve the Same Ao (Pre-MS C)**

- **Economic Analysis - Evaluates the Return on Investment of an Alternative to Status Quo (After Design Frozen &**

Return on Investment (ROI)

- **ROI = Net Present Value Savings of Improvement / Net Investment Cost for Improvement**
  - **Net Present Value Savings from Recurring Cost Differences of Improvement vs. the Status Quo**
  - **Net Investment Costs covers Improvement Initial Costs less any Remaining Status Quo Initial Costs**

- **Alternatives with the Highest ROI are typically worth funding the Improvement Investment Costs**

Reasons for Estimating Life Cycle Costs (LCC)

- **Design Tradeoffs Yield LCC Differences that Aids Decision Making**
- **Decisions Made Early Drive Future Supportability and Support Costs**
- **Project Managed Acquisition Programs Require Cost Estimates for Financial Planning & Budgeting**
- **Quantifying LCC Helps to Identify Drivers**

If RAM LCC impacts are measured, LCC can be managed and reduced

Army LCC Management Models to be Discussed

- **COMPASS*** **LOGSA**

  Computerized Optimization Model for Predicting & Analyzing Support Structures

- **ACE IT***
  DASA(CE)

  Automated Cost Estimating Integrated Tools

- **LCET*** **CE LCMC**

  Logistics Cost Estimating Tool (Includes Time Phased COMPASS)

*** TOOLS ARE LINKED FOR INTEGRATED LCC ESTIMATING**

ACE IT Usefulness

- **Integrates Cost Estimates or Data From Other Computer Programs**
- **Often Used for Program Office Estimates & LCC Estimates**
- **Provides Credible Estimates for Time Phased Non-Logistics Acquisition Costs**

LCET Model Usefulness

- More Credible Logistics Costs in LCC Estimates
- Time-Phased COMPASS Module Results Yield Highest Fidelity Support Cost Estimates
  - Relates Item Reliability to Readiness & Support Costs
  - Adjusts Results for Worth of Warranty
- Logistics Cost Spreadsheet Module Covers
  - Macro-Level Logistics Costs w/o Item Level Reliability
  - Non-COMPASS Logistics Costs After Items Known
- Merges Multiple Runs of Different Time Frames
- Links COMPASS & ACE IT to Permit Concurrent Supportability Optimization & LCC Estimation

Logistics Costs Coverage

	Logistics Cost Spreadsheet Categories	Time Phased COMPASS Cost Categories
1	Military Operators	
2	Energy	
3	Field Support	
4	Repair Labor	Common Labor +Screening +Contact Team +Special Repairmen
5	Contractor Logistics Support	Contractor Fixed Cost +Recurring Contractor Repair
6	Warranty Costs not included in Unit Costs	
7	Scheduled Maintenance/Overhaul	
8	Initial Provisioning (Includes Retail & Wholesale)	Initial Spares
9	Replenishment Spares	Consumption Spares
10	Inventory Holding Costs	Inventory Holding
11	Support Equipment	Common & Peculiar Support Equipment
12	Test Program Sets	Test Program Sets
13	System Specific Training	
14	Training Materials Development & Maintenance	
15	Post Deployment Software Support	
16	Technical Documentation	Documentation
17	Transportation (Includes Shipping, Packaging & Handling)	Transportation
18	Integrated Materiel Management	Requisition +Cataloging +Bin
19	Post Production Project Management/Systems Eng	
20	System Hardware Changes	
21	Facilities/Sites Activation	
22	System Specific Base Operations	
23	Lease Operations and Maintenance	
24	Demilitarization/Disposal	
25	Industrial Readiness	

Time Phased COMPASS Covers 10 of 25 Logistics Cost Categories With More Fidelity Than the Logistics Cost Spreadsheet Module

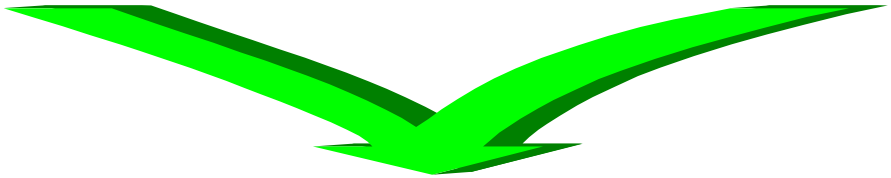
What Each Model In Integrated Tool Set Determines

- **COMPASS - Optimizes Viable Support Concepts to Ao**
  - **Least Cost Initial Provisioning**
  - **2-Level vs. 3-Level Maintenance**
  - **Return LRU vs. SRU**
  - **Organic vs. Contractor**
  - **Repair vs. Throwaway**
- **Time Phased COMPASS - Annual COMPASS Costs**
- **LCET Spreadsheet - Adds in Other Logistics Costs**
- **ACEIT – LCC Tool Adds in Non-Logistics Costs**

Optimizes Supportability & Computes LCC Concurrently

Improving Supportability Analysis & LCC Estimating Concurrently

	Supportability Analysis	Logistics Cost Estimating	Non-Logistics Cost Estimating
ACEIT	N/A	Red	Green*
COMPASS	Green	Yellow	N/A
LCET	N/A	Green	N/A



Integrated/Linked Models

Supportability Analysis	Logistics Cost Estimating	Non-Logistics Cost Estimating
Green	Green	Green*

Acquisition Policies Supported by Integrated Tools

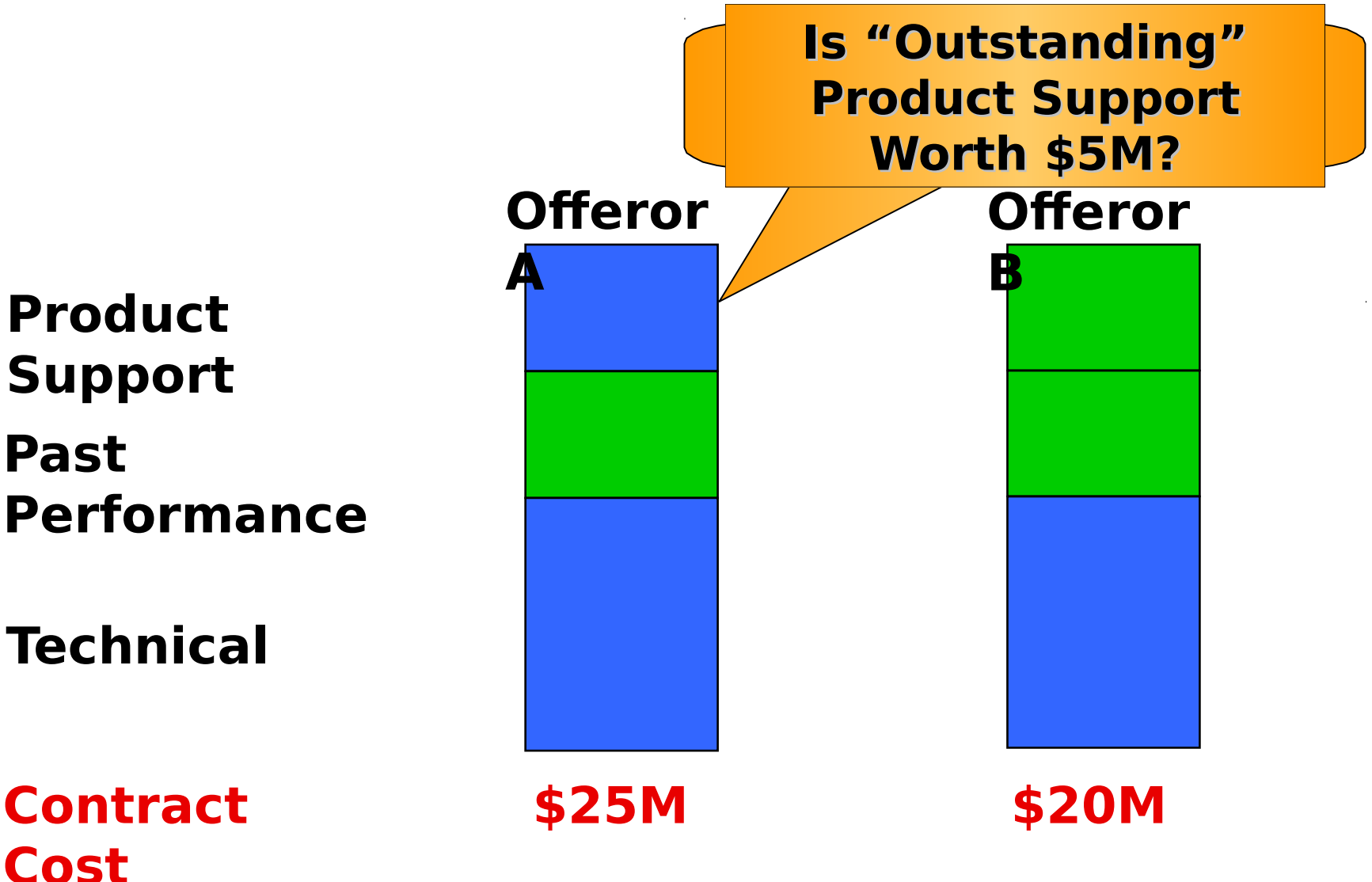
DoD Policies:

- Perform Design & Supportability Tradeoffs to LCC
- Perform Supportability Analysis Integral to Systems Engineering
- Aid Performance Based Logistics Implementation for Product Support

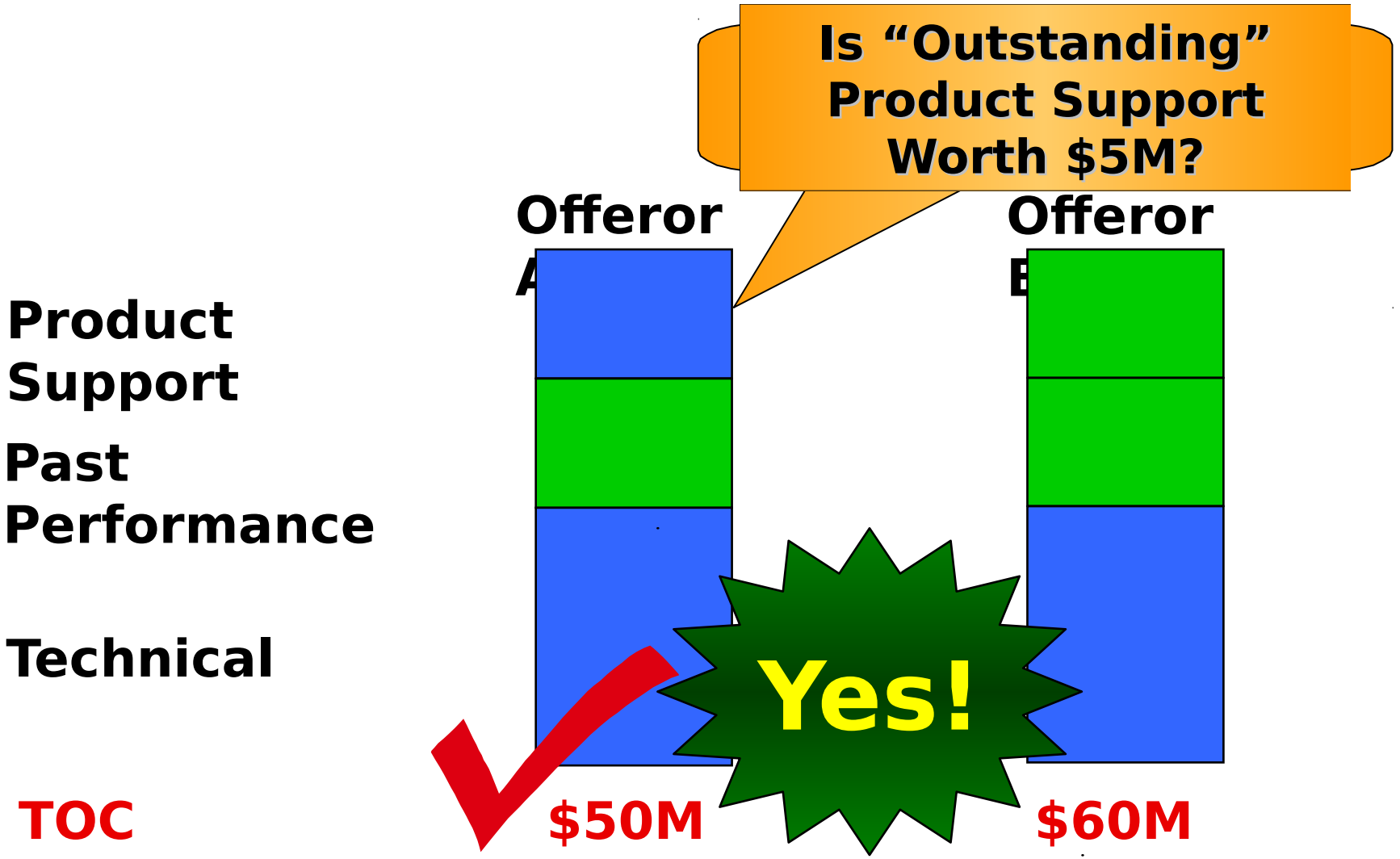
Army Policies:

- Manage TOC Reduction
- Evaluate TOC as a Factor in Source Selection
- Makes Supportability Co-Equal to Cost, Schedule & Performance

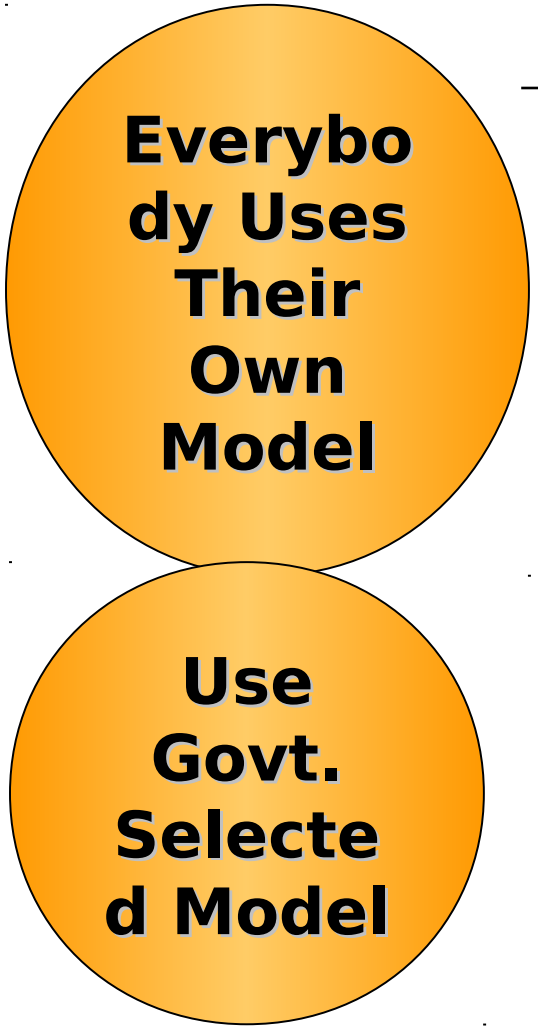
Source Selection Example



Source Selection Example



Source Selection Modeling Alternatives



	Advantages	Disadvantages
Everybody Uses Their Own Model	• Easy For Bidders/Contractor • Can Be Used Over Life Cycle	• Govt. Needs To Validate/Understand • Prolongs Evaluations • Lack Source Selection Common Baseline
Use Govt. Selected Model	• Common Baseline • Encourages Meeting Modeling Objectives • Ease Of Evaluation • Proven/Validated Technique	• More Upfront Work for Bidder/Contractor • Chance of Initial User Error

Reasons Contractors Should Use Integrated Tools in Acquisitions

- **Provides a Common Evaluation Baseline among Bidders**
- **Expedites Evaluation by Government After Data or Analyses are Obtained**
- **Improves Government/Industry Teaming with Common Analyses**
- **Permits Contractor to Determine an Optimum Support Effectiveness/Logistics Chain Structure & LCC Baseline**
- **Permits Contractor to Evaluate the Impact of Proposed Changes to a LCC Baseline**

Data Required to Analyze TOC

- **Appropriate Data is Needed to estimate Government & Contractor Responsible Costs**
- **Data Depends on Proposed Contractor Support**
  - **When contractor fixes end items, only end item level data needed**
  - **When Govt fixes end items & Contractor fixes LRUs, need to know how often LRUs are removed and costs for LRU repair**
  - **When Govt fixes LRUs with SRUs, need to know how often LRUs & SRUs are removed and costs for their repair or replacement**

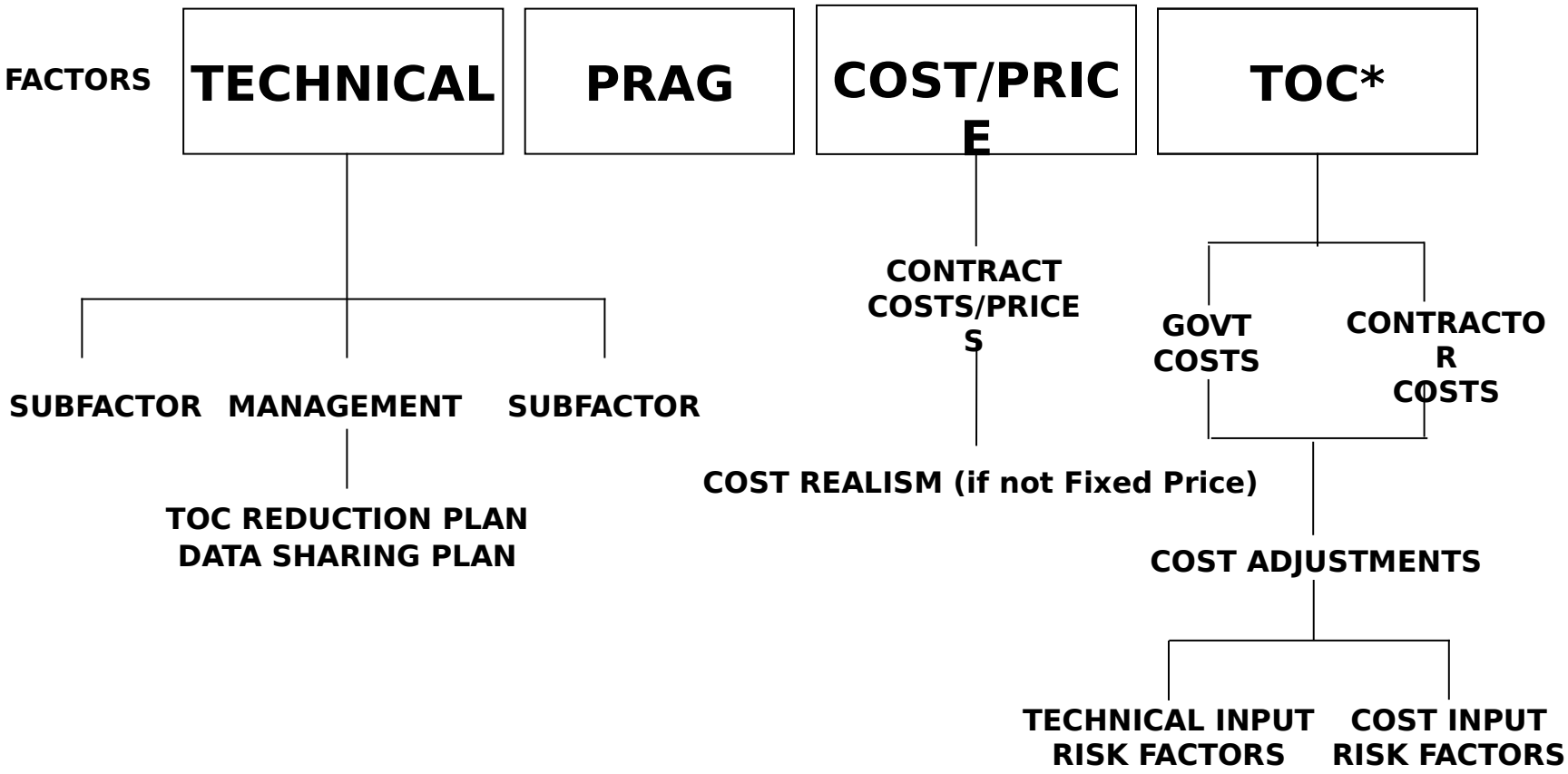
When A Tailored Spreadsheet Is A Good Evaluation Alternative

- **Contractor Repaired End Item**
- **Small Number of Known TOC Driver LRUs that are Contractor Repaired**
- **Legacy End Item where Maintenance is Not a TOC Driver**

Which Integrated Tool Combo to Use for TOC Evaluation

- **ACEIT & LCET - In Development Prior to Knowing LRUs**
- **ACEIT, LCET & COMPASS – In Development or LRIP When LRUs Known & Government Repairs End Item**
- **LCET & COMPASS – In Production or Re-Procurement If Maintenance is a TOC Driver**

Source Selection Plan Evaluating Total Ownership Costs



* TOC EVALUATION RESULTS IN AN ESTIMATED AMOUNT OF DOLLARS

Costs that Tend to be Drivers in Many Systems

Non-Logistics Costs:

- **Software Development**
- **Recurring Production Cost**

Logistics Costs:

- **Post Deployment Software Support**
- **Replenishment Spares**
- **Contractor Logistics Support - or - Organic Repair**

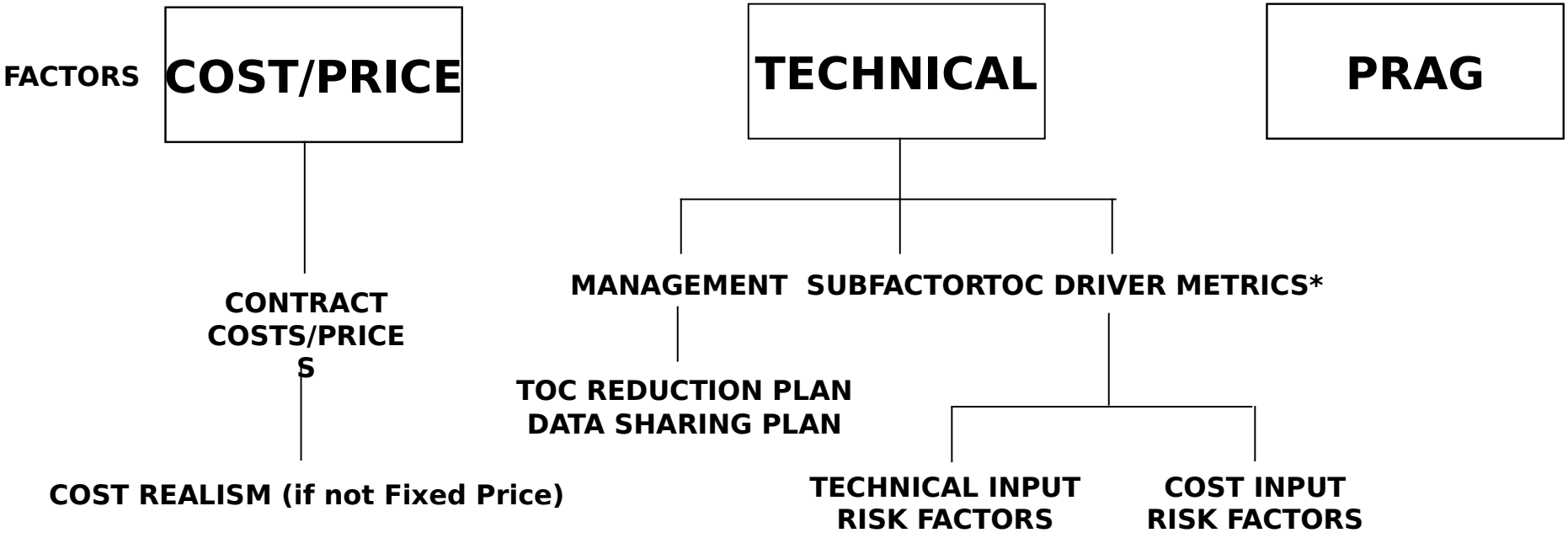
Logistics Cost Drivers that Tend to Vary by System

- **Systems with Platforms**
  - **Operators**
  - **System Specific Training**
  - **Energy – POL**
- **Man-pack Equipment/ Some Sensors**
  - **Energy - Batteries**
- **Low Reliability or High Operational Availability**
  - **Initial Provisioning**
  - **Inventory Holding Costs (Frequent Item Upgrades)**
- **Long Term, Failure Free Warranties**
  - **Warranty Costs**

Logistics Cost Drivers that Tend to Vary by System

- **Low Density, Highly Complex Equipment**
  - **System Engineering/Program Management**
  - **Integrated Material Management**
- **High Density, Highly Complex Systems**
  - **System Specific Training**
  - **Training Material Development & Maintenance**
- **Some Secure, Sensitive Systems**
  - **Facilities/Site Activations**
  - **System Specific Base Operations**

Source Selection Plan
Evaluating Total Ownership Cost Drivers

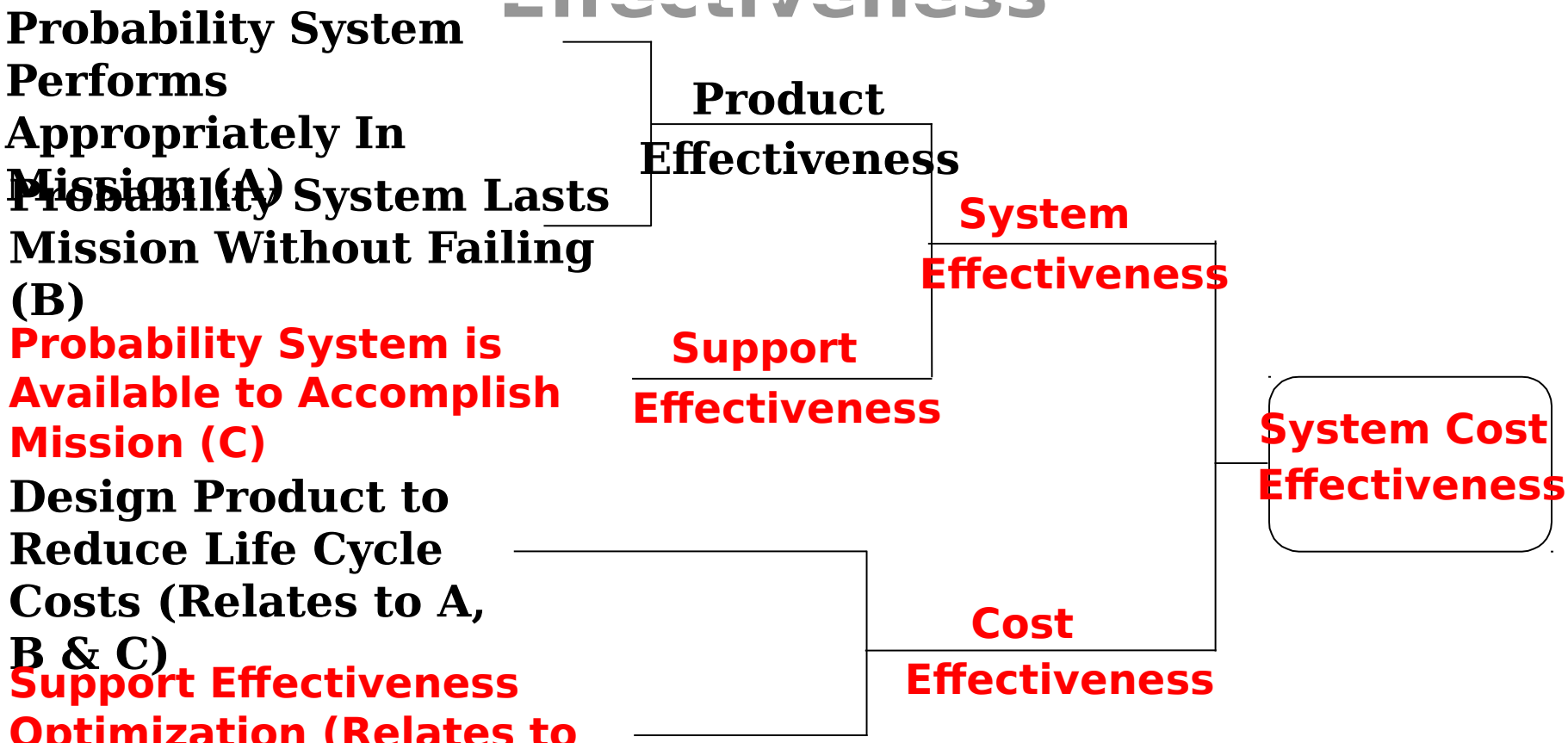


* TOC EVALUATION RESULTS IN AN ADJECTIVAL RATING FOR QUANTITATIVE THRESHOLDS

How Current Acquisition Practices Can Improve

- **Analyze System Reliability and Operational Availability Requirements**
- **Use Government Ao Driven LCC Models for Best Value Decisions & Plan to Encourage Industry to Use Them**
- **Use TOC and/or Ao as an Evaluation Factor in Source Selection**
- **Provide Incentives to Industry for TOC Reduction**
- **Establish a Shared Data Environment**

Influence of RAM and LCC Reduction on System Cost Effectiveness


Probability System Performs Appropriately In Mission (A)
Probability System Lasts Mission Without Failing (B)
Product Effectiveness
Probability System is Available to Accomplish Mission (C)
Support Effectiveness
System Effectiveness
System Cost Effectiveness
Design Product to Reduce Life Cycle Costs (Relates to A, B & C)
Support Effectiveness Optimization (Relates to B & C)
Cost Effectiveness
Basically Contractor Responsibility
Typically Government and Contractor Responsibility